GES 554 Partial Differential Equations

Project 4: [100 pts]

Due: 9th May 2015 by noon.

"The father of the tower was Eiffel—but the idea and the math were me." – Maurice Koechlin

Use the **Ritz method** to solve the square Poisson problem described in Farlow's Lesson 45 problem 5 on page 369. The functional to minimize is

$$J(y) = \int_0^1 \int_0^1 \left(u_x^2 + u_y^2 + 2u \sin(\pi x) \right) dxdy$$

The BC is u=0 on the square's boundary.

- Report the value at the center (x=0.5, y=0.5)
- Provide a surface plot of the solution, u.
- Verify your Ritz solution with a simple finite difference solution (Excel is ideal).
- **Keep your writeup simple. A formal memo is not required.**